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## SHANTI SWARUP BHATNAGAR PRIZES: 1981

Scientists/technologists have been awarded for the Shanti Swarup Bhatnagar Prizes in science and technology for the year 1981. Each award carries a cash of Rs 20,000 and a certificate. The recipients of the awards, line-wise, are:

**Physical Sciences:** Dr S.M. Roy, Tata Institute of Fundamental Research, Bombay; and Prof. R. Srinivasan, Indian Institute of Science, Bangalore

**Chemical Sciences:** Dr D. Balasubramanian, Centre for Cellular & Molecular Biology, Hyderabad; and

Prof. B.M. Deb, Indian Institute of Technology, Bombay

**Biological Sciences:** Dr P.V. Sane, Bhabha Atomic Research Centre, Bombay; and Dr Sushil Kumar, Indian Agricultural Research Institute, New Delhi

**Engineering Sciences:** Prof. S.C. Dutta Roy, Indian Institute of Technology, New Delhi

**Medical Sciences:** Dr U.C. Chaturvedi, K.G. Medical College, Lucknow.

**Mathematical Sciences:** Prof. J.K. Ghosh, Indian Statistical Institute, Calcutta. □

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receiver performance. Such a testing facility does not exist anywhere else in the country at present.

\*As most of the ICs and other discrete devices used are available from more than two sources, tie-up with any particular supplier or manufacturer is eliminated.

After fabricating the laboratory prototype, the institute has taken up, at its batch production unit, work on product engineering, batch fabrication and evaluation. In the process of product engineering, various sub-assemblies of the TV set have been modified so as to improve the reliability and economize the production cost. Also, considerable attention was paid to aesthetics and serviceability.

The status of colour TV technology developed by CEERI has now reached a stage where it can be taken up for commercialization. Furthermore, the institute has looked into such aspects—beyond technology transfer—as obsolescence of design, easy and continuous availability of components, reproducibility, ease of servicing and

## CEERI's colour television technology is ripe for commercialization

Following its pioneering role in the development of monochrome television technology in India, the Central Electronics Engineering Research Institute (CEERI), Pilani, has entered the field of colour TV. Not merely that, the institute has also demonstrated success—its expertise at many an occasion—national and international. Some of the salient features of the design of the CEERI TV set:

Design of the receiver as a whole is based on latest trends in TV technology, integrated circuits have been used wherever available.

In line with modern design trends, the CEERI colour TV receiver uses modular construction. The design provides option to use any one of the three power supplies: (i) switched-mode power supply, (ii) thyristor-controlled power supply, and (iii) electronically regulated power supply. The signal processing circuit provides stable

operation for the complete deflection system.

\*The switched-mode vertical deflection in class-D mode is the most efficient circuit ever used in a colour TV receiver. This gives good linearity and is very compact and reliable.

\*The receiver uses a multichannel VHF electronic tuner which can also be adapted to remote control and memory-type tuning systems.

\*Receivers of 20 in. and 26 in. sizes can be made available with minor modifications in the 20 in. receiver designed by CEERI. Work on low-cost 20 in. version of colour TV receiver has already been undertaken and it is expected to be completed soon. Efforts have been made right from the beginning to use a maximum possible number of indigenous components to keep down the cost of the receiver.

\*The CEERI receivers are tested as per IEC document for colour TV

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maintenance, and indigenous availability of components.

The institute is considering, in association with the National Research Development Corporation of India (NRDC), the feasibility of setting up a demonstration plant for producing colour TV sets.

The institute proposes to approach public sector undertakings and TV manufacturers in the private sector to elicit their interest in the CEERI technology. At present the following three options are being indicated for technology transfer: (i) taking up of the

know-how directly from the institute's batch production unit; (ii) taking up of the know-how through participation in a demonstration/proving plant along with the participation of NRDC; and (iii) horizontal technology transfer from the party that participates with NRDC in setting up a demonstration plant.

With CEERI know-how the TV manufacturer will have the benefit of expert consultation and advice in the event of any problems on production line and it will also be possible for the manufacturing unit to receive a continuous flow of information. □

### IIP develops wax-deoiling technology

For designing an industrial wax-deoiling plant sufficient pilot plant data have been generated as a result of studies carried out by the Indian Institute of Petroleum (IIP), Dehra Dun, in collaboration with Engineers India Ltd (EIL). A processing scheme specifically for deoiling Barauni slack wax has been developed.

This was at the instance of the Petroleum Processes Development Co-

ordination Group, which—consisting, besides these two organizations, of the Indian Oil Corporation Ltd and the National Research Development Corporation of India—finalized in 1979 a detailed programme of work for developing technology for solvent-dewaxing and wax-deoiling. Extensive as the studies were, they included: (i) dewaxing test runs in the Madras refinery unit and simulating the runs at

IIP to correlate laboratory data with actual plant data; (ii) deoiling of slack waxes from the Madras and Barauni refineries; and (iii) physico-chemical analysis of feedstocks, products, solvents, etc.

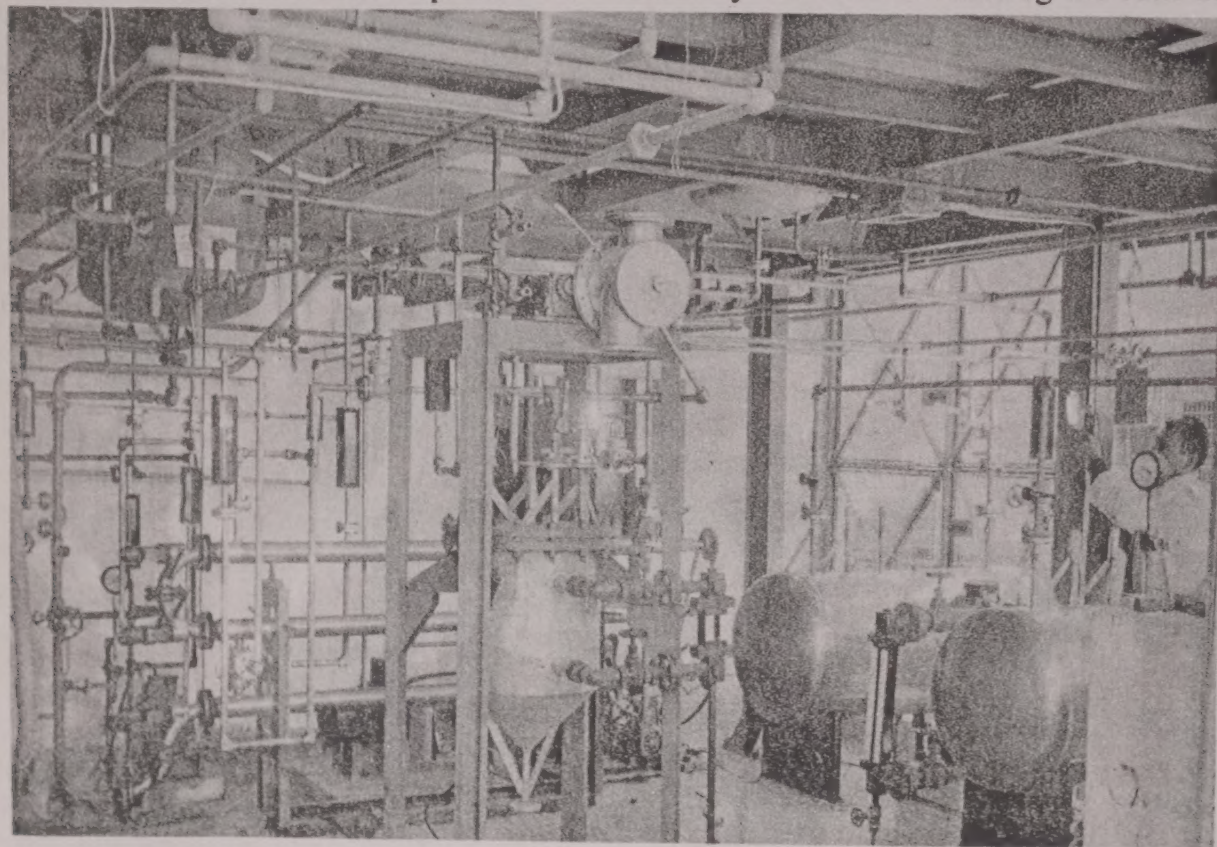
To conduct scale-up studies, a pilot plant was set up and successfully commissioned at IIP in December 1980 jointly by IIP and EIL. The unit is suitable for both dewaxing lube stocks and deoiling slack wax, has a throughput of 2-10 litres/hr of waxy stock. Several runs have been successfully carried out in the pilot plant on slack waxes from Madras and Barauni refineries. The deoiled wax samples meet the requirements of IS: 4654-1974 in respect of oil content and melting point. The yield of the deoiled wax was as high as 80% by wt. A finishing treatment by conventional methods or hydrorefining is required to improve colour and colour stability in order to obtain a product for a specific end use. The product wax finds a wide range of uses as in food wrappers, candles, cosmetics, chlorinated paraffin wax, tarpaulins, pencils, crayons and so forth.

The technology has several salient features. One of them is the use of an indigenously available solvent, viz. methyl isobutyl ketone. While the yields of products are high, the plant's requirements of fresh solvent on feed basis as also of expensive scrapped surface chillers and refrigeration are low, as compared to the conventional process which employs methyl ethyl ketone, an imported solvent. Furthermore, the load on solvent recovery section is also low.

Other important industrial projects in which IIP is engaged relate to process work for establishing a microcrystalline wax unit at Haldia Refinery, and studies on revamping the wax plant at Digboi Refinery. □

### New optics for bubble chamber scanner

The scanning of bubble chamber photographs is an important job in the



*Wax-deoiling plant installed and commissioned at the Indian Institute of Petroleum, Dehra Dun. With a throughput of 2-10 litres per hour, the plant is suitable for both dewaxing lube stocks and deoiling slack wax. The yield of deoiled wax, which conforms to oil content and melting point requirements of the Indian Standard specifications, is as high as 80%. The product wax finds an extensive range of applications as in coating food wrappers, and manufacture of candles, cosmetics, chlorinated paraffin wax, pencils, polishes and a myriad other such products.*



experimental study of sub-atomic decays and interactions. Often, a large number of stereophotographs have to be screened for locating interesting events, classifying their topology, making coordinate measurements, and even kinematically identifying the particles by mathematically reconstructing the three-dimensional geometry of the track.

For quick retrieval of information from bubble chamber photographs, the Central Scientific Instruments Organisation (CSIO), Chandigarh, had earlier developed a machine the know-how of which was assigned through the National Research Development Corporation of India to Andhra Scientific Co., Machilipatnam, for commercial exploitation. Machines of such design have been provided the nucleus for carrying out experimental researches in high-energy particle physics, principally by the Jammu, Panjab and Banaras Hindu Universities, in collaboration with the Joint Institute of Nuclear Research, Dubna, USSR. To suit the requirements of the films then available, however, the image magnification was kept only at  $10\times$ .

Keeping pace with the more advanced developments, CSIO has now developed a new optical system of the bubble chamber scanner to yield  $20\times$  magnification and to render distortion-free bright imagery on the projection table. This new optics, developed in response to the request by the participating universities, is expected to help conduct important experiments on K-p interaction at 110 GeV.

The new optics is designed in such a manner that the bubble chamber scanners which CSIO had earlier supplied can be used at will either at  $10\times$  or  $20\times$  magnification. When the machine is required to be used at  $20\times$ , an additional parabolic lens assembly is introduced in the condenser housing; the old objectives are unscrewed and the new objectives of focal length 74 mm and relative aperture of  $f/2.8$  are introduced in position. The projection table and the other controls for forward

and reverse motions of the film and its inching remain as before.

An additional advantage of the new optics is that it provides more illumination on the screen so the operator can view the image with ease and comfort.  $\square$

### Indigenous silica gel as a gas chromatographic substrate

Silica gel is one of the most widely used adsorbents in gas chromatography. As a gas chromatographic substrate it should fulfil specific surface properties. At present, silica gel used as a gas chromatographic substrate is imported and there is no indigenous substitute for it. Systematic studies carried out at the Central Fuel Research Institute, Dhanbad, have led to a method for the preparation of silica gel of gas chromatographic grade which has shown better selectivity than the standard imported gel.

In the preparation of the gel, pH has a significant effect on chromatographic selectivity towards permanent gases. A decrease in selectivity of the gel as the pH increases from 1.1 to 4.1 is apparent. The best separation of common gases has been achieved with silica gel prepared at pH 1.1. The chemical nature of the surface, column permeability and the packing structure of the bed are practically unaffected by the gel pH. The effect of gel pH on the capacity ratio of carbon dioxide has been ascribed to the effective surface area available to the sorbate molecule rather than the true surface area determined by the sorption of nitrogen. Contrary to the general behaviour, the peak asymmetry increases with the increase in gel pH. The structural heterogeneity and the heterogeneity of the adsorption force field of the gels are probably related to a random condensation mechanism dependent on pH. The specific efficiencies are not very different for the silica gel samples produced at very low pH. Thus, for practical purposes, silica gel of high surface area produced at low pH is suitable for separating common gases,

and gel with low surface area is unsuitable for such separation.  $\square$

### Recovery and dealkylation of tar acids

Proper utilization of tar acids available from low-temperature carbonization tar as well as from the hydrogenation products of coal has been investigated by Shri K.K. Tewari at the Central Fuel Research Institute, Dhanbad. About 2.0 to 2.5% by weight of coal appears as tar acids in low-temperature carbonization, whereas in coal hydrogenation, tar acids account for 8-10% of the weight of coal. Of the total quantity of tar acids, the lower members, namely phenol and cresols, account for only 40%. These can be directly utilized as starting material for chemical industries. The remaining 60%, constitutes higher phenols which as such do not have direct utilization potential.

Lower phenols have been extracted from the tar oil fractions with a new solvent, namely dilute aqueous ammonia, the use of which has not been reported elsewhere for extraction of phenols from tar oils. The novel feature of this solvent (40% by wt of dilute aqueous ammonia) is that it is specific towards the lower phenols, which are of direct use to industries.

Processes are being developed for the conversion of the higher boiling tar acids left in the raffinate phase to lower phenols. A chromia-alumina catalyst has been developed for converting higher phenols into lower ones, especially cresols, through the dealkylation/transalkylation route. From a detailed examination of the nature of the catalyst and product pattern, a probable mechanism of the reaction over the chromia-alumina catalyst has been postulated. Based on this investigation, a conceptual scheme has been worked out for commercial extraction of phenols from the low-temperature tar oil fraction and dealkylation/transalkylation of the higher fractions of phenols to lower members, which are in demand in industries.



Shri Tiwari, who worked under the guidance of Dr P.N. Mukherjee, of CFRI, was awarded Ph.D. degree by the Patna University for his thesis based on the studies. □

### Toxic effects of chlorinated hydrocarbons on fish

The toxicity of some important chlorinated hydrocarbons to common freshwater fish has been evaluated by Smt. Shanta Satyanarayana of the National Environmental Engineering Research Institute (NEERI), Nagpur. The chlorinated pesticides used for the study were aldrin, dieldrin, BHC, DDT and chlordane—all potentially hazardous chemicals in the environment.

The investigation included acute and chronic bioassays and bioaccumulation on common freshwater fish, such as *Cyprinus carpio* (mirror carp), *Puntius ticto* (weedfish), and *Lebistes reticulatus* (guppy), which are of economic importance.

The study has shown that the increase in toxicity directly correlates with the increasing concentration of the pesticides. *C. carpio* was found to be the most sensitive and *L. reticulatus*, the least sensitive to chlorinated hydrocarbons. DDT and dieldrin were highly toxic, and BHC, the least toxic among the pesticides studied. Different tissues showed different degrees of accumulation of pesticides; liver tissue showed maximum accumulation and kidney was the next.

The findings of the study in respect of lethal toxicity, threshold concentration, safe concentration, dilution factor, and safe application rate are of considerable value in pollution abatement and conservation of aquatic fauna. The evaluation of toxicity in an aquatic ecosystem is an important yardstick for further pollution control measures.

Smt. Satyanarayana, who worked under the guidance of Dr K.P. Krishnamoorthi of NEERI's Ecology & Ecosystem Division, was awarded Ph.D. degree by the Nagpur University for her thesis based on the study. □

### Citrate lyase complex from *Escherichia coli*

Kum. Sita P. Nilekani of the Biochemistry Division of the National Chemical Laboratory (NCL), Pune, has isolated pure citrate lyase complex for the first time from the bacteria *Esch. coli*. The purified enzyme consists of three non-identical subunits with six copies each of a 54,000 daltons acyl transferase subunit and a 32,000 daltons acyl lyase subunit associated with one copy of a 85,000 daltons acyl carrier protein subunit. The complex is unique among citrate lyases in containing a single copy of a large acyl carrier protein subunit instead of the usual six copies, and in the multimeric states of its aggregation under native non-denaturing conditions.

The amino acid compositions of the subunits have been characterized. The acyl carrier protein molecule in addition has been shown to contain four 4'-phosphopantetheine prosthetic groups and a single N-terminal residue. Fingerprint analysis of the acyl carrier protein indicates repeats of identical sequences, suggestive of its being a fused subunit.

Kum. Nilekani, who worked under the guidance of Dr C. Siva Raman of the same division of NCL, was awarded Ph.D. degree by the University of Poona for her thesis titled 'Studies on microbial enzymes: Citrate layase (EC 4.1.3.6) from *Escherichia coli*'. □

### Cholinergic influences on learning events

The role of the central cholinergic mechanism in the formation of long-term memory has been investigated within the framework of a general concept of synaptosomal and nuclear regulations of synaptic connectivity, which form the neurobiological correlates of learning and memory. The researcher, Shri H.K. Singh of the Division of Pharmacology of the Central Drug Research Institute, Lucknow, carried out the studies at the Institute of Pharmacology and

Toxicology of the Academy of Medical Sciences, Magdeburg, GDR.

Rats were trained to avoid foot shock by being made to escape into the lighted shock-free alley of a Y-maze. Running into the dark alley was punished with foot shock. Cholinolytics and choline mimetics were injected to the rats at different times after the completion of training. In some experiments, these drugs were also given prior to the commencement of training in order to study their effects on the training performance.

Cholinolytics impaired the training performance but improved the retention. Retention was tested by giving a relearning test to the trained rats at different hours after drug application. The experiments also showed that the hippocampal cholinergic system has a special significance in the formation of a long-term memory.

The findings of the study suggest that the consolidation of a long-term memory is a process possessing a spacious and long-term dimension, which could be influenced even days and weeks after training. The central cholinergic transmission plays a very significant role in the individual mechanisms of this process. The effect of cholinergic drugs is both dose- and time-dependent and is most significant in the early labile phase of consolidation. The site of action of these drugs appears to be hippocampus.

Shri Singh, who carried out the studies under the guidance of Prof. H.J. Matthies of GDR's Academy of Sciences, was awarded Ph.D. degree by the Academy of Medical Sciences, Magedburg, for his thesis based on the studies. □

### Floristic studies of Vaishali district

An up-to-date floristic account of the Vaishali district of Bihar, with special reference to weeds and cultigens, has been prepared. The researcher was Shri M.N. Das, a UGC teacher fellow, who made the studies under the guidance of



K. Maheshwari of the National Botanical Research Institute, Lucknow. The studies have shown that there are tracts of low-lying areas, *chaurs*, which are inhabited by many species of phytes and halophytes. The district harbour a rich and interesting flora during different seasons. Exotic weeds like *Parthenium* and *Alternanthera* recently introduced in the district, are threatening the indigenous flora as well as agricultural crops. A numerical analysis of the flora revealed that there are 830 species belonging to 498 genera and 126 families of angiosperms. There are several new interesting plant records for the district. While the dicotyledons are well represented by Fabaceae (*sensu lato*) and Poaceae, the families Poaceae and Fabaceae constitute about two-thirds of the monocotyledonous species. The Orchidaceae is represented by a single species, *Zeuxine strateumatica* Reicht., a ground orchid. The district is famous for its banana plantations. More than 100 cultivars (including local, vegetable and dual types) of banana from different parts of the country are being maintained at the National Banana Research Station, Hariharpur, Orissa. Winged bean (*Psophocarpus tetragonolobus* DC.) has been recently introduced in the district. Betel vine (*Piper betle* Linn.) is cultivated largely in the 'Barai' community in specially reserved orchards.

Shri Das was awarded Ph.D. degree from the University of Bihar, Patna, for his thesis based on the investigations. □

### Marine geophysical studies in the Bay of Bengal

The structure and tectonics of the Bay of Bengal have been studied on the basis of data obtained from continuous measurements of sea floor topography and intensity of gravity and magnetic fields on some tracks of the *R.V. Chain* during TASDAY Expedition. The researcher was Shri T.C.S. Rao of the National Institute of

Oceanography's regional centre at Waltair.

The studies show that the continental margin along the east coast of India could be divided into (i) southern margin, (ii) central margin, and (iii) northern margin according to its characteristic features. The central margin is narrow and has undergone active tectonic movements while the southern margin is passive and broader. Prominent structural elements delineated over the eastern margins are the 'Marginal High' and 'Marginal Basin'.

Over deep oceans, significant gravity low trending north-south was recorded. Magnetic data recorded an isolated anomaly along 90°30'E. Basement configuration computed from the magnetic anomalies and the crustal structure deduced from free-air gravity anomalies delineated a 'Graben', 'Central Basin' and subsurface 'High' as the northward extension of the Ninety-east Ridge. The graben is nearly 220 km wide and trends nearly north-south. It strikes into the continental slope and shelf north of Visakhapatnam.

There is no definite evidence either from the earlier investigations or from the present studies to identify the crust of the Bay of Bengal either as continental or oceanic. The characteristic features of the magnetic anomalies and the depth to Moho suggest that the continental margins are of continental crust and the oceanic crust underlies the deep sea floor. But the seismic refraction and reflection experiments recorded a velocity of the order of 6.22 km/s for the basement layer which is very low for an oceanic crust. The trends of the structural elements deduced from the present studies show close parallelism with some major geological formations over the peninsular India, suggesting that the Bay of Bengal must have formed owing to the foundering of large continental mass.

Shri Rao, who carried out the studies under the guidance of Prof. V. Bhaskara Rao of the Department of Geophysics of the Andhra University, Waltair, was

awarded Ph.D. degree by this university for his thesis based on the studies. □

### PROGRESS REPORTS

NEERI Annual Report: 1980-81

The annual report of the National Environmental Engineering Research Institute (NEERI), Nagpur, for 1980-81, published recently, presents the activities of the institute and its nine zonal laboratories in two parts; part one gives the infrastructural details and general programmes of work and part two reports the progress of work in the various R&D projects in progress or completed. The report reveals that the institute laid emphasis on projects concerning rural water supply, air quality surveys, wastewater treatment, and microbial degradation of industrial wastes.

The institute completed the second phase of the slow-sand filtration project sponsored by the WHO International Reference Centre for Community Water Supply, The Netherlands. Under the programme, four demonstration plants, one each at Abub Shehar (Haryana), Kamayagoundapatti (Tamil Nadu), Borujwada (Maharashtra) and Pothunuru (Andhra Pradesh) were commissioned and their performances evaluated.

With a view to developing simple methods for water treatment the institute designed and fabricated a unit (90 litres/hr) which could treat raw water of turbidity in the range 100-500 NTU and could deliver filtered water of less than 1.0 NTU turbidity. The system provides for alum coagulation, flocculation, clarification and filtration operations in one modular unit. The unit is easy to operate and maintain and requires minimum equipment and hence low capital.

A carbonaceous filter aid, FA-5, was developed as a satisfactory substitute for diatomite filter powder for pressure water filtration. The filter aid, processed from wood charcoal powder, was found to be effective in water filtration up to a terminal headloss of 3.0 kg/cm<sup>2</sup>. Water turbidity could be reduced from 200 to 5



NTU. However, a study on bacteria removal efficiency of FA-5 and a few diatomaceous earth filter aids showed that these could not give a filtrate free from organisms even at raw water coliform level of  $2.0 \times 10^2/\text{ml}$ .

A laboratory-scale model of an anaerobic cow-dung digester set up to study its microbiological aspects has been working efficiently. The biodegradability of lignocellulosic materials present in cow-dung could be increased by alkali treatment (2 g of sodium hydroxide per 100 ml of slurry) and hence gas production.

Following studies on the treatment of wastewater/effluent of a number of industrial units, the institute has suggested suitable measures. These related to: the synthetic drugs plant of the Indian Drugs and Pharmaceuticals Ltd, Hyderabad; coffee pulping units; titanium dioxide pigment plant of Kerala Minerals and Metals Ltd, Quilon; fertilizer complex of Fertilisers and Chemicals Travancore Ltd, Cochin; synthetic organic chemical industry (HOCL, Rasayani); Ossein and DCP plant of Kerala Chemicals and Proteins Ltd, Kothikudam; and Ambuja Petrochemicals Ltd, Patancheru.

The feasibility of using anaerobically treated pulp mill wastewater for agriculture was studied on a field scale. The treated effluent came under the group  $C_3S_1$  and could be used on coarse texture soil. Only salt-tolerant crops could be grown.

Ambient air quality monitoring was initiated in cities where NEERI's zonal laboratories are located. Data were collected on suspended particulate matter, sulphur dioxide, sulphation rate, nitrogen oxides, and dust fall. A report on 'Air quality in selected cities in India' was published.

Under the Indo-US bilateral programme, three research projects, viz. (i) Investigation, assessment and treatment of toxic discharges from phosphatic fertilizer and basic organic chemical industries; (ii) Study on drinking water sources and supplies for virus and bacteria; and (iii) Impact of fugitive

and stack emissions from selected industries on neighbourhood air quality, have been taken up. Interim reports at the end of the first year have also been submitted. Arising out of the data collected in these projects, environmentally compatible industrial complexes could be planned for selected industries.

The institute brought out 34 special reports on its in-house R&D projects, sponsored projects, and consultancy assignments.

The laboratory's budget for 1980-81 was about Rs 109.860 lakh, and its revenues from sponsored projects/consultancy services amounted to Rs 46.09 lakh. □

## Union Catalogue of Scientific Conference Proceedings

### A Pilot Fascicule

The Indian National Scientific Documentation Centre (INSDOC), New Delhi, is making an attempt to build up a data base of records of conference proceedings available in the libraries of major scientific institutions from the point of view of main search elements, e.g. keyword(s) in the title of the publication/conference, place and date. As a first step, INSDOC has brought out a pilot fascicule containing sample entries from eight national laboratories, a few institutions in Durgapur and the Tata Institute of Fundamental Research, Bombay. A package program has been developed for processing the data through an IBM 360/44 computer. The final printouts of 577 records and a keyword index were obtained with the help of a HP 1000 system.

INSDOC invites comments/suggestions on the pilot fascicule, which can be had from: The Scientist in charge, Union Catalogue Section, Indian National Scientific Documentation Centre, Hillside Road, New Delhi 110012. □

## CBRI-Building Industry Get-together

The Central Building Research Institute (CBRI), Roorkee, organized, in col-

laboration with the Institution of Engineers (India) (Rajasthan Centre), Rajasthan Public Works Department (B&R), and Rajasthan Housing Board, a get-together building industry from 27 to 29 November 1981 at Jaipur. The get-together organized by CBRI during the year, it was attended by more than 150 engineers, architects, builders, building materials manufacturers inaugurated by Shri B.D. Mathur, an eminent engineer and retired chairman of Rajasthan Public Works Commission.

The CBRI's director, Prof. D. Mohan, in his welcome address spoke of the improvements made by the institute in the existing materials and construction techniques appropriate to Rajasthan. The CBRI scientists delivered three lectures: (i) Recent developments in the field of foundations and building construction—Shri Jaisingh; (ii) New materials and processes through research—Dr I. Masood; and (iii) Functional planning and design of buildings—Shri Mathur.

An exhibition depicting new materials, components and techniques developed by CBRI has been arranged.

## Analytical Quality Control

WHO training course at NEERI. A 12-day Global Environmental Monitoring Systems (GEMS) training programme on 'Analytical Quality Control' was held at the National Environmental Engineering Research Institute (NEERI), Nagpur, from 1 to 12 December 1981. This is the second international programme which has been organized under the joint auspices of NEERI and WHO as part of the GEMS programme for countries in South-East Asia. The first GEMS programme on 'Water Quality Monitoring' was conducted at NEERI in 1979. [CN, 29 (1979), 165]

The course was attended by scientists and technologists engaged in water quality monitoring programme



East Asian and Middle East  
ies including Bangladesh,  
Indonesia, India, Sri Lanka,  
and Thailand.

Richard Helmer, Coordinator for  
programme at WHO, Geneva,  
used the participants, and Dr  
Hunt, Head, Analysis,  
Environmental Protection, Water  
Research Centre, Medmenham  
Laboratory, UK, delivered a series of  
lectures. □

## INTRAMURAL RESEARCH

### Control of *ber* gall mites

CSIR research fellow, Shri Ashok  
Sharma, has studied the morphology,  
biology, varietal susceptibility and  
control of the *ber* gall mite, *Larvacarus  
transitans* (Ewing) (Acarina :  
Tetranychidae), infesting *Zizyphus* at  
Jodhpur in Rajasthan during 1978-80.  
The research fellow worked under the  
supervision of Prof. K.S. Kushawaha,  
Professor of Eminence, Department of  
Entomology, at the Rajasthan College  
of Agriculture, Udaipur.

During the faunistic survey, seven  
species of phytophagous mites, viz.  
*Larvacarus transitans*, *Brevipalpus phoe-  
niscis*, *Tenuipalpus punicae*,  
*Tetranychus* sp., *E. hirsti*, *Oligonychus*  
*sp.*, *Tetranychus* sp., *T. neocal-  
ifornicus* and *Eutetranychus* sp.,  
and five predatory mites belonging to  
Cheyletidae and Phytosciidae were  
recorded.

A qualitative survey for *L. transitans*  
at different localities of Rajasthan,  
based on gall intensity, revealed that it is  
a major pest in Udaipur, Bharatpur,  
Kota, Jaipur, Jodhpur and Sikar. Its  
infestation commenced in October, and  
the maximum intensity of galls was  
observed during May-June on four *ber*  
varieties, viz. Tikari, Sev, Local  
Selection and Banarsi Pawandi, at  
Udaipur.

Corresponding to gall intensity, the  
peak population was observed during  
May-June. The peak population de-  
clined gradually, possibly due to

increase in temperature and consequent  
distortion of galls. Temperature and  
rainfall did not show any bearing on  
population fluctuation, but humidity  
showed a reverse effect on population  
build-up.

The varietal resistance in descending  
order of significance was as : Sev,  
Tikari, Local Selection, Banarsi  
Pawandi. The relative damage (%) was  
higher in the variety Banarsi Pawandi  
than in Local Selection.

The incidence of the predatory  
cheyletid mites commenced from the  
second week of June and continued up  
to the second week of August. It peaked  
in the third week of July and then  
abruptly decreased in the second week  
of August. Temperature, relative  
humidity and rainfall did not have any  
effect on fluctuation of population. The  
efficiency of cheyletid mite was also  
studied in the laboratory.

To reduce the pest infestation,  
pruning the twigs up to 60 cm after crop  
harvest can be considered as an effective  
measure, as it does not affect fruit  
bearing.

The relative efficacy of six pesticides,  
viz. phosphamidon, dinobuton, cyhe-  
xatin, phosalone, dimethoate and  
dicofol, against *L. transitans* was  
studied both in the field and in the  
laboratory. In field trials, the efficacy  
was minimum in 24 hr and maximum  
after 72 hr. Of the six pesticides,  
phosphamidon proved most effective,  
followed by dimethoate and dinobuton;  
the rest were inferior. In the laboratory  
also, phosphamidon was most effective,  
followed by dimethoate.

Shri Sharma was awarded Ph.D.  
degree by the Udaipur University for his  
thesis based on the studies. □

### Orientation, homing, migration and hibernation in bats

Some interesting observations on the  
behaviour of bats in a semi-natural cave  
environment, their homing ability,  
migration, and hibernation have been  
made by a CSIR research fellow. The

researcher was Dr Anil Wason, who, as  
a senior research fellow and later as  
postdoctoral fellow, carried out the  
studies at the Department of Zoology,  
University of Jodhpur, Jodhpur, during  
February 1980 to October 1981.

Of the four species of insectivorous  
bats whose homing ability was studied,  
*Rhinopoma microphyllum* was found to  
perform the best, and *Hipposideros  
fulvus* the least. Homing had an inverse  
relation to the distance of release.  
Further, bats homed better from certain  
directions than from other directions;  
also they exhibited better homing on  
dark nights than on bright nights.

The observations on distance-  
orientation in bats may hold promise, if  
the study is pursued in depth, of  
unravelling the basics of echolocation in  
bats, which ultimately may lead to  
developing aids for the human blind.

Of the 10 species of microchiroptera  
reported from Jodhpur, only *R. micro-  
phyllum* exhibited migration. This  
species migrates circannually on the  
onset of winter from its original roosting  
site, an underground tunnel about 10  
km south-west, and winters in an open  
well in the Jodhpur Fort. Although the  
factors responsible for the migration of  
bats are not clear, the fact that their  
wintering sites are situated within a few  
kilometres of their summer sites  
suggests that seasonal movement is  
perhaps conditioned by climatic  
changes.

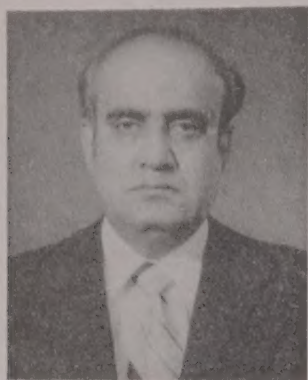
The most interesting observation is  
that throughout winter *R. micro-  
phyllum* remains in a state of torpor.  
Prior to migration there was depo-  
sition of fat on the bat's caudo-  
pelvic region of the body which was later  
utilized during winter torpidity. Thus  
torpidity appears to be an adaptation to  
circumvent the scarcity of food in winter  
months.

A finding of public health importance  
is that bats harbour the third-stage  
infectious larvae of *Physaloptera* species  
and *Cyrnea* species, which proves that  
these flying mice serve as reservoir hosts  
for the nematodes. □



## VASVIK Award to Dr L.K. Doraiswamy

Dr L.K. Doraiswamy, Director, National Chemical Laboratory, Pune, has been chosen for the 1980 VASVIK



Industrial Research Award for 'out-standing research in the field of chemical sciences and technology'. This prestigious award, instituted by Vividhlaxi Audyogik Samshodhan Vikas Kendra (VASVIK), Bombay, carries a cash prize of Rs 25,000, along with a gold medal and a citation. □

### PERSONNEL NEWS

#### Appointments/Promotions

At the Structural Engineering Research Centre, Roorkee, Dr S.P. Sharma, Dr N.S. Bhal and Dr M.G. Tamhankar, all Scientists EI, have been promoted, on assessment, to position Scientist EII with effect from 6 August 1981.

Shri O.P. Makar has been appointed Manager (Sales & Advertisement) at the Publications & Information Directorate, New Delhi (4 Dec. 1981).

Shri T. Banerjee, Scientist A, Publications & Information Directorate, New Delhi, has been promoted as Scientist B (2 Dec. 1981). □

### PATENTS INFORMATION

Indian Pat. 148658  
(Application No. 399/Del/78)

Process for the recovery of nitrate value of the mother liquor obtained after the separation of potassium carnallite as potassium nitrate  
S. Mahapatra, S.N. Das, and P.K. Palit  
Regional Research Laboratory, Bhubaneswar

In this process the mother liquor obtained from the earlier process

(Indian Pat. 148657)\* is treated with an adequate amount of potassium chloride (as aqueous saturated solution) and cooled to 0°C. whereby 90-95% pure potassium nitrate is obtained. Thus nearly 50% of the nitrate value present in the byproduct mixed acid used for the earlier process is isolated and the residual mother liquor from this process is recycled to the earlier process for recovery of magnesium value in the form of carnallite.

Potassium nitrate finds extensive application in detonator, gunpowder, ceramic, fertilizer, cracker, match, and many such industries. □

Indian Pat. Application No. 299/Del/78  
Process for manufacture of non-metallic backing strip for use in metal welding

S.P. Dasgupta, S.K. Bhattacharya, B.N. Misra & S.K. Karmarkar  
Central Mechanical Engineering Research Institute, Durgapur 713 209

The process, covered by the patent for the manufacture of a nonmetallic backing strip used in welding operations, which while ensuring welding of one side only achieves the benefit of getting both the sides welded. In heavy structural fabrications where several steel plates are joined, such as in ships, pressure vessels and crane girders, welding has to be done from both sides. Most of the large fabricators resort to welding plates first from the front side supplemented by welding on the other side by turning the whole job upside down. Such a practice of welding is time-consuming and expensive. To obviate these drawbacks the practice widely in vogue is to weld the thicker plates from one side only by using metallic backing strip. However, this practice has not been very successful since it is difficult to remove the metallic backing strips from the back side after welding.

The special advantage of the non-metallic backing strip is that it removes itself automatically after one side is welded but ensures both-side weld joints

\*This patented process is published in CN, 31(1981) 176.

without any detriment to the characteristics of the weld material. The backing strip is produced by the use of an indigenously available raw material

### Research Committee on Science, Technology and Development

A new CSIR research committee on Science, Technology and Development has been constituted with effect from December 1981 up to March 1984. The committee will examine all requests for CSIR's financial assistance for projects relating to science and technology and development of science, various aspects of technology transfer, technology in rural areas, information science, and will assess the feasibility, appropriateness and urgency of proposals.

The membership of the committee is given below:

Shri A.J. Kidwai (*Chairman*)  
Vice Chancellor, Jamia Millia  
University, New Delhi 100 025

Prof. D.D. Narula  
Director E, Indian Council of Social  
Science Research, New Delhi 110 002

Prof. Sushil Kumar Mukherjee  
(*ex-Vice Chancellor*, Calcutta  
University), 332, Jodhpur Park, Flat No. 1,  
Jodhpur Court, Calcutta 700 061

Prof. P.K. Rohatgi  
Director, Regional Research  
Laboratory, Bhopal

Prof. A. Rahman  
Acting Director, National Institute of  
Science, Technology and Development  
Studies, CSIR Complex, New Delhi  
110 012; and Chief (Planning)  
CSIR, Rafi Marg, New Delhi 110 001  
Head, Extramural Research  
CSIR, Rafi Marg, New Delhi 110 001  
(*Convener*)

#### Correction

#### Sewage-grown algae for animal feed

In the news item relating to the above topic published in CN, 31(1981), 156, the area of the sewage pond is 450 m<sup>2</sup> and not 4.50 m<sup>2</sup> as printed. We are informed by NBRI who have detected the mistake in their original communication sent to us.